PATENT ABSTRACTS OF JAPAN

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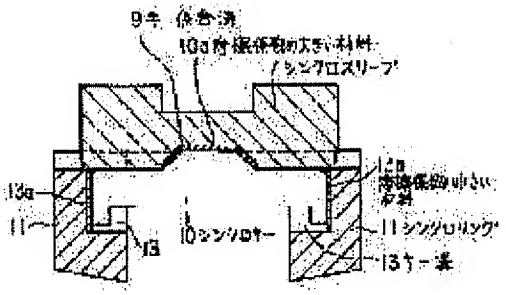
(54) SYNCHRONOUS MESHING GEAR FOR USE IN TRANSMISSION

(57)Abstract:

PURPOSE: To provide a synchronous meshing gear for use in a transmission, which reduces the force of a synchro sleeve to climb over a synchro key and in which a synchro ring is not hooked to the synchro key when circumferentially moving relative thereto, so that squealing of gears can be prevented and the chamfer of the synchro ring is promptly engaged with clutch gears.



CONSTITUTION: A key engaging groove 9 for engagement with both spline teeth and a synchro key 10 is provided on the inner periphery of a synchro sleeve 7 and a chamfer for enagement with the spline teeth and a key groove 13 for engagement with the synchro key 10 are provided in the respective portions of a synchro ring 11, and the meshing face of the key engaging groove 9 which engages with the inclined projecting portion 10a of the synchro key 10 is made from a material 9a with a large coefficient of friction, and the bottom face of the key groove 13 which is made to abut to the synchro key 10 is made from a material 13a with a small coefficient of friction.

* NOTICES *

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CLAIMS

[Claim(s)]
[Claim 1]A synchro sleeve which has a key engagement groove which engages with inner circumference with inclination heights of a spline tooth and a synchronization key.
A synchronization ring which has on a periphery a key groove which engages with a chamfer which engages with said spline tooth, and said synchronization key.
While forming an engagement face of a key engagement groove which is a synchronous engagement device in a gearbox provided with the above, and engages with inclination heights of said synchronization key with material with a large coefficient of friction, At least one side of the bottom of a key groove which contacts the end face of said synchronization key or a synchronization key was formed with material with a small coefficient of friction.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application]This invention relates to the synchronous engagement device in the gearbox of vehicles.
[0002]
[Description of the Prior Art]The synchronous engagement device in the gearbox of the vehicles in vehicles, such as a track, is constituted as shown in drawing 3. That is, the hub 2 rotated to this and one is formed in the main shaft 1.
[0003]The 1st gear 4 that has KURATCHIGYA 3 in the one end side on both sides of the hub 2 is formed in the main shaft 1, and the 2nd gear 6 that has KURATCHIGYA 5 is formed in the other end side. To the periphery of the hub 2, rotation is impossible in the hoop direction of the main shaft 1, and the synchro sleeve 7 which can slide on shaft orientations freely is formed.
[0004]The spline tooth 8 and the key engagement groove 9 are established in the inner circumference of the synchro sleeve 7, the inclination heights 10a of the synchronization key 10 engage with this key engagement groove 9 removablely, and the synchronization key 10 is being engaged for the shaft orientations of the main shaft 1, enabling free sliding. 10b is KISU pulling which presses the synchronization key 10 in the direction of inner circumference of the synchro sleeve 7.
[0005]As shown in drawing 4, the synchronization rings 11 and 11 fit into said 1st and 2nd gears 4 and 6, and the key groove 13 which engages with the chamfer 12 and the synchronization key 10 which engage with the spline tooth 8 of said synchro sleeve 7 is established in this synchronization ring 11.
[0006]And if a sector moves the synchro sleeve 7 to shaft orientations, the synchronization key 10 will move with a motion of the synchro sleeve 7, The end face of the synchronization key 10 contacts the bottom of the key groove 13 of the synchronization ring 11, moves the synchronization ring 11, and pushes against the inclined plane of KURATCHIGYA 3. Since there is rotational difference in the synchronization key 10 and the synchronization ring 11 at this time, the

end face of the synchronization key 10 slides on the bottom of the key groove 13, and the synchronization key 10 contacts the medial surface of the key groove 13.

[0007]If the synchro sleeve 7 moves further, the inclinated tooth of the spline tooth 8 of the synchro sleeve 7 and the chamfer 12 of the synchronization ring 11 will carry out field contact, a motion of the synchro sleeve 7 will be stopped, and a rotational synchronous action will be performed. At this time, the synchronization key 10 separates from the key engagement groove 9 of the synchro sleeve 7, and is resisted and forced on the energizing force of the KISU pulling 10a. If a synchronous action is completed, rotational difference will be lost, the chamfer 12 and KURATCHIGYA 3 of the synchronization ring 11 will gear, and a synchronization operation will be completed.

[0008]

[Problem(s) to be Solved by the Invention]However, when it is going to shift from a neutral state, in order to make it a synchronous engagement device smell be in the state which can be synchronized for a short time certainly, In order that the key engagement groove 10a of the synchro sleeve 7 may enlarge key ******** to the synchronization key 10, frictional resistance between both is made small.

[0009]As a result, when the synchro sleeve 7 moves, the key engagement groove 10a overcomes the synchronization key 10 early, and this is worsening the shift feeling. The bottom of the key groove 13 adjacent to the end face of the synchronization key 10 and this end face is formed in a flat face, and it is formed so that field contact may be carried out. Therefore, when the synchronization ring 11 moves relatively to a hoop direction only for clearance x minutes after the synchronization key 10 contacts the bottom of the key groove 13, it is easy to be caught by wear in a mutual working error and a use process etc., and has become a cause of GYA ****. When the frictional resistance of the synchronization key 10 and the key groove 13 is large, the chamfer 12 and KURATCHIGYA 3 of the synchronization ring 11 gear, and there is a problem that a synchronization operation requires time until it completes.

[0010]The place which this invention was made paying attention to said situation, and is made into that purpose, While reducing key ******** to the synchronization key of a synchro sleeve, After a synchronization key contacts the bottom of a key groove, when a synchronization ring moves relatively to a hoop direction, there is no connection, GYA **** can be prevented, the chamfer and KURATCHIGYA of a synchronization ring gear promptly, time until it completes a synchronization operation can be shortened, and it is in providing the synchronous engagement device in the gearbox which can aim at improvement in a shift feeling.

[0011]

[Means for Solving the Problem]A synchro sleeve which has a key engagement groove which engages with inner circumference with inclination heights of a spline tooth and a synchronization key in order that this invention may attain said purpose, In a synchronous engagement device in a gearbox which has a synchronization ring which has on a periphery a key groove which engages with a chamfer which engages with said spline tooth, and said synchronization key, While forming an engagement face of a key engagement groove which engages with inclination heights of said

synchronization key with material with a large coefficient of friction, it is in having formed at least one side of the bottom of a key groove which contacts the end face of said synchronization key, or a synchronization key with material with a small coefficient of friction.

[0012]

[Function]By forming the engagement face of the key engagement groove which engages with the inclination heights of a synchronization key with material with a large coefficient of friction, When movement of a synchro sleeve is certainly transmitted to a synchronization key and the bottom of the KISHIN clo key which moreover contacts the end face of a synchronization key or a synchronization key forms with material with a small coefficient of friction, The frictional resistance at the time of a synchronization ring moving relatively to a hoop direction is small, the chamfer and KURATCHIGYA of a synchronization ring gear promptly, and a synchronization operation is completed.

[0013]

[Example]Hereafter, although one example of this invention is described based on a drawing, the former and an identical configuration portion attach the same number, and omit explanation.

[0014]As shown in drawing 1 and drawing 2, the synchronization key 10 provided in the hub 2 is forced on the synchro sleeve 7 by the KISU pulling 10b. The inclination heights 10a of the synchronization key 10 are engaging with the key engagement groove 9 of the synchro sleeve 7, and the inner surface at least is formed with the material 9a with a large coefficient of friction of this key engagement groove 9.

[0015]As the material 9a with a large coefficient of friction, it is a copper system, an iron system sintering material, and a copper-ceramic system sintering material (inorganic system friction material), and is formed by sticking on the inner surface of the key engagement groove 9, or coating. Therefore, the frictional resistance of the key engagement groove 9 and the synchronization key 10 can be large, and key ******** can be reduced.

[0016]As for the synchronization key 21 supported by Babb 2 enabling free movement to the shaft orientations of the main shaft 1, the both-ends side has countered the key groove 13 of the synchronization ring 11. The key groove 13 which engages with the chamfer 12 and the synchronization key 10 which engage with the spline tooth 8 of the synchro sleeve 7 is established in the synchronization ring 11, and the bottom of this key groove 13 is formed with the material 13a with a small coefficient of friction.

[0017]As the material 13a with a small coefficient of friction, it is polymer materials, such as nylon, 6 nylon, and Teflon, and is formed by sticking on the bottom of the key groove 13, or coating. Therefore, although the frictional resistance of the key groove 13 and the synchronization key 10 is small, the end face of the synchronization key 10 slides on the bottom of the key groove 13 and the synchronization key 10 contacts the medial surface of the key groove 13, When the synchronization ring 11 moves relatively to a hoop direction only for clearance x minutes, there is no connection and he is trying to move smoothly.

[0018]Namely, if it is drawing 1 (a) at the neutral time and a sector moves the synchro sleeve 7 to shaft orientations from this state, The synchronization key 10 which is engaging with the key

engagement groove 9 moves with a motion of the synchro sleeve 7, and the end face of the synchronization key 10 contacts the bottom of the key groove 13 of the synchronization ring 11, moves the synchronization ring 11, and pushes against the inclined plane of KURATCHIGYA 3.

[0019]In order for the inclination heights 10a of the synchronization key 10 not to escape from the key engagement groove 9 since the inner surface of the key engagement groove 9 is formed with material with a large coefficient of friction at this time, and to make a locomotive faculty transmit to the synchronization key 10, the end face of the synchronization key 10 contacts the bottom of the key groove 13 promptly.

[0020]Next, as shown in the figure (b), since there is rotational difference in the synchronization key 10 and the synchronization ring 11, the end face of the synchronization key 10 slides on the bottom of the key groove 13, and the synchronization key 10 contacts the medial surface of the key groove 13, but. Since it is formed with material with small frictional resistance, when it moves smoothly and the synchronization ring 11 moves relatively to a hoop direction only for clearance x minutes, the bottom of the key groove 13 does not have connection and moves promptly.

[0021]If the synchro sleeve 7 moves further, the inclinated tooth of the spline tooth 8 of the synchro sleeve 7 and the chamfer 12 of the synchronization ring 11 will carry out field contact, a motion of the synchro sleeve 7 will be stopped, and a rotational synchronous action will be performed. At this time, the synchronization key 10 separates from the key engagement groove 9 of the synchro sleeve 7, and is resisted and forced on the energizing force of the KISU pulling 10b. If a synchronous action is completed, rotational difference will be lost, the chamfer 12 and KURATCHIGYA 3 of the synchronization ring 11 will gear, and a synchronization operation will be completed promptly.

[0022]In said one example, although the bottom of the key groove 13 of the synchronization ring 11 was formed with the material 13a with small frictional resistance, The end face of the synchronization key 10 may be formed with material with small frictional resistance, and both the bottom of the key groove 13 and the end face of the synchronization key 10 may be formed with material with small frictional resistance.

[0023]

[Effect of the Invention]As explained above, while forming the engagement face of the key engagement groove which engages with the inclination heights of a synchronization key with material with a large coefficient of friction according to this invention, It is in having formed at least one side of the bottom of the key groove which contacts the end face of a synchronization key, or a synchronization key with material with a small coefficient of friction.

[0024]Therefore, while reducing key ******** to the synchronization key of a synchro sleeve, After a synchronization key contacts the bottom of a key groove, when a synchronization ring moves relatively to a hoop direction, there is no connection, GYA **** can be prevented, the chamfer and KURATCHIGYA of a synchronization ring gear promptly, time until it completes a synchronization operation can be shortened, and it is effective in the ability to aim at improvement in a shift feeling.

[Translation done.]